The GI Lab
VETERINARY MEDICINE & BIOMEDICAL SCIENCES
TEXAS A&M UNIVERSITY
Promoting Gastrointestinal Health in Companion Animals
Newsletter - Spring 2018
Editors: JM Steiner, JA Lidbury & JS Suchodolski

# What's Inside:





# News from the Gastrointestinal Laboratory at Texas A&M University

As we start the new year we always pause and reflect on the year that has passed, and once again, it has been a productive year for the GI Lab.

In January last year one of our long-time phone consultants, Dr. Craig Ruaux, moved to New Zealand where he joined the faculty at Massey University. Unfortunately, moving to New Zealand meant that he could no longer serve as a phone consultant. We certainly wish him well for his new role, and if you google his name, you can already see several publications that he has penned since moving. We were very fortunate that we were able to fill this consultant position by recruiting Dr. Katie Tolbert (see photo at right) who serves as Assistant Professor of Small Animal Internal Medicine at the University of Tennessee. Katie has done a lot of research on *Tritrichomonas foetus* in cats.[1] For example, she identified a cysteine protease in *T. foetus* that may prove to be not only of diagnostic but also therapeutic significance.[2] She also has worked a lot on antacids in both dogs and cats with her work showing that effective antacid therapy in dogs requires twice-daily administration of omeprazole, which changes the way we practice on a daily basis.[3] We are very excited to have her join our team of consultants who are available to answer your questions on the diagnosis and management of complex gastrointestinal cases. Our team of consultants is available Monday to Friday at (979) 862-2861 and will support you if you have questions regarding laboratory results or challenging GI cases.

Our diagnostic services continue to be very successful. Over the years our weekly submissions have grown from approximately 100 to over 1,100 every week. After several years of not increasing our prices we feel we have now reached a point where a modest price increase is needed. We do this only after great deliberation. On the next-to-last page of this newsletter you will see a table highlighting changes to our test fee schedule beginning May 1, 2018.

As our submission numbers have increased we have added staff to continue to provide quick turnaround times and reliable service. However, with increased staff our facilities have been bursting at the seams. Almost a year ago we were assigned extra space in close proximity to our current facilities. It has taken almost a year for us to design the most functional service lab we can possibly imagine, and remodeling of this space should start in the next few months. Please note that this project should have no impact on our service as the new space will be finished before the old space will undergo remodeling. We hope that this newly remodeled space proves to be not only highly functional, but also a pleasant space for our crew to complete their daily tasks in. We truly have an incredible team here at the GI Lab. Earlier this year, we had two days of ice storms here in College Station, and while this may be business as usual in Wisconsin, down here in Texas it is a big deal. For two

*(continued on next page)*

**Dr. Katie Tolbert and her dog Birdie**

days we received virtually no packages, only to receive almost 500 packages on a single day after the ice storm had passed. That is more than twice what we usually receive in a single day, but our team pulled it off – every box was opened, every accession logged, and every sample run. What a team!

As you probably know, we are always involved in a large number of research studies, most of which are administered by our graduate students or our research staff. We often identify potential candidates for a study from our database. We apologize in advance for disturbing your workflow, but on occasion a member of our team will need to contact you to see whether you and your client are interested in enrolling one of your patients in one of our studies. Sometimes we just need patient material and sometimes we are conducting a treatment trial where your patient may benefit from a treatment that may not otherwise be available. We greatly appreciate your continued support by enrolling eligible patients into our studies. Without your case material our studies are simply not feasible. Please find a summary of some of our most important clinical trials in the table on the last page of this newsletter. So, thanks for helping out, and thanks for your continued patronage! (Jörg M. Steiner)

References

[1]Tolbert MK, Gookin JL. Mechanisms of *Tritrichomonas foetus* pathogenicity in cats with insights from venereal trichomonosis. *Journal of Veterinary Internal Medicine.* 2016;30(2):516-526. doi:10.1111/jvim.13920.

[2]Tolbert MK, Stauffer SH, Brand MD, Gookin JL. Cysteine protease activity of feline *Tritrichomonas foetus* promotes adhesion-dependent cytotoxicity to intestinal epithelial cells. Appleton JA, ed. *Infection and Immunity.* 2014;82(7):2851-2859. doi:10.1128/IAI.01671-14.

[3]Parkinson S, Tolbert K, Messenger K, et al. Evaluation of the effect of orally administered acid suppressants on intragastric pH in cats. *Journal of Veterinary Internal Medicine.* 2015;29(1):104-112.

# Another Update on Serum Lipase

Triglycerides are important long-term energy storage molecules in the body, and in order to use them as such, triglycerides have to be moved in and out of cells within different organs of the body. Every time a triglyceride has to cross a cell membrane, a lipase is required to hydrolyze it, thus creating hydrolysis products that are more polar than the triglyceride itself. While pancreatic lipase is an important digestive lipase, it is far from the only lipase. When we measure serum lipase activity, differentiation of various sources of lipase activity is not possible. None of the substrates we use for measurement of serum lipase activity are specific for pancreatic lipase. For example, DGGR, a substrate that was first introduced into human medicine in the 1990s, which has recently gained some popularity for use in dogs and cats, has been shown to also serve as a substrate of pancreatic lipase related protein 2 (PLRP2) in humans.[1] PLRP2 is not exclusively secreted by pancreatic acinar cells but also immune cells. In addition, DGGR also serves as a substrate for various esterases, which further impacts specificity.[1] The lack of specificity of lipase activity assays stands in sharp contrast to that of the measurement of pancreatic lipase concentration using an immunoassay (i.e., pancreatic lipase immunoreactivity; PLI). PLI assays are species-specific and are available as laboratory tests (Spec cPL® and Spec fPL®) and patient-side tests (SNAP cPL® and SNAP fPL®). Several new patient-side tests for measurement of PLI are expected in the market place. The first one to arrive was the VetScan cPL rapid test for use with the VetScan VUE analyzer. Marketing material as well as the analyzer readout suggests that this new assay provides accurate serum cPLI concentrations within a margin of ±65 µg/L compared to the Spec cPL® assay. However, initial validation in our laboratory showed that this new assay lacks linearity, precision, and reproducibility, affecting the outcome of the results. When the same sample was measured repeatedly it often resulted in a different interpretation. We will continue to do research on various diagnostic tests for serum lipase. You can find more detailed information of serum lipase activity and pancreatic lipase immunoreactivity on our webpage (*http://vetmed.tamu.edu/gilab/research/pancreatitis*). (Jörg M. Steiner)

Reference

[1]Beisson F, Tiss A, Riviere C, et al. Methods for lipase detection and assay: a critical review. *European Journal of Lipid Science and Technology* 2000;102:21.

# Things You May Not Know About Us...

At any given time we are usually involved in approximately 100 research projects. While most of the projects on this list wouldn't surprise you – some of them might. Last year I started to briefly describe some of these projects that are outside our main focus area, and I would like to continue this.

The marmoset is a small New World monkey that frequently suffers from a serious gastrointestinal disease, commonly referred to as 'wasting disease', which is associated with significant morbidity and mortality.

A few years ago we joined a group of other investigators to try to better define this chronic enteritis in the marmoset and maybe even decrease its frequency. We studied a wide variety of biomarkers in both affected marmosets and healthy controls, and we even developed an assay for the measurement of alpha$_1$-proteinase inhibitor concentration in the feces from marmosets.[1] Interestingly, while these studies have been proceeding, the nature of the wasting disease has been changing along with an overall decrease in the severity and possibly frequency, and while we have learned a lot about this disease over the last 5 years, we still know very little about it. So there is plenty of work to be done. (Jörg M. Steiner)

Reference

[1]Parambeth JC, Suchodolski JS, Steiner JM. Purification and partial characterization of α1-proteinase inhibitor in the common marmoset (*Callithrix jacchus*). *Research in Veterinary Science.* 2015;99:17-22. doi:10.1016/ j.rvsc.2015.02.005.

# Vet Ku - Texas A&M 2018 INTERNAL MEDICINE CONFERENCE Focus: Gastroenterology

We are very excited to announce the inaugural Internal Medicine Conference in partnership with the Faculty of Veterinary Medicine at Kasetsart University in Bangkok, Thailand. The conference will be held at the family-friendly five-star Centara Grand Mirage Beach Resort, in beautiful Pattaya, Thailand, between Monday, October 29, and Friday, November 2, 2018. The focus this year will be small animal gastroenterology and hepatology. Twenty-five hours of top quality continuing education will be delivered by a panel of internationally renowned experts.

For the past 10 years the Gastrointestinal Laboratory has been very lucky to enjoy a close relationship with the Faculty of Veterinary Medicine at Kasetsart University, Thailand. Dr. Steiner regularly teaches and lectures at their University, and we have had several sponsored graduate students from Thailand, including Dr. Panpicha Sattasathuchana, who now runs the feline internal medicine service at Kasetsart University and is one of the first Diplomates of the Asian College of Veterinary Internal Medicine.

***"World-class continuing education in a breathtaking setting."***

The small animal teaching hospital in Bangkok is truly impressive and sees approximately 350,000 cases a year. To strengthen ties between Kasetsart University and Texas A&M University, and to allow more veterinarians to experience this special cultural exchange, we decided to set up a joint annual conference to be held in Thailand. Naturally, the focus of the inaugural event will be small animal gastroenterology and hepatology!

Our in-depth program focuses on providing you with the latest practically relevant information on gastrointestinal, exocrine pancreatic, and liver diseases in dogs and cats. To this end, several sessions outline a logical diagnostic approach to challenging but common problems, while others will help you formulate better treatment plans. The final hour of each day will be an interactive session, covering complex and controversial topics. Audience participation is very much encouraged, and we anticipate some great discussions. We have been fortunate to recruit some fantastic speakers (the offer of a trip to Thailand probably helped!). Stanley Marks from the University of California-Davis, David Twedt from Colorado State University, and Katie Tolbert from the University of Tennessee will join myself (Jonathan Lidbury), Jörg Steiner, and Jan Suchodolski from the Gastrointestinal Laboratory. We will be happy to talk about your challenging cases and answer your questions throughout the conference. Lectures and interactive sessions will run between 8:00 am and 1:10 pm, allowing you free afternoons to enjoy the beautiful venue with your family. In addition to the educational program, an evening social program will also be offered. This will provide an excellent opportunity for you to network and mingle with colleagues from the United States and Thailand.

The conference will be held at the Centara Grand Mirage Beach Resort in Pattaya, Thailand. This exciting family-friendly five-star resort is a "destination in its own right, a place where everyone will find something to amaze and delight. It offers 8 dining venues, an award-winning spa, a kids' club, water sports, and an extensive water park." We have negotiated a fantastic rate for conference participants with rooms starting at 5,000 THB (about 160 USD) per night including a breakfast buffet or 6,000 THB with a daily spa treatment (about 192 USD). We also have club level rooms available that offer access to the Mirage Club throughout the day. Please book early as this hotel is very popular!

The drive to and from the main airport in Bangkok is easy and convenient and takes approximately one and a half hours. When you make your reservation at the Grand Mirage Centara a representative will be happy to book transportation to and from Bangkok's Suvarnabhumi International Airport for you.

Multicultural vibrant Pattaya lies on the east coast of the Gulf of Thailand and is about 90 miles from Bangkok. Built around a crescent shaped bay, it was one of Thailand's first beach resorts. The Centara Grand Mirage Beach Resort is 10 minutes to the south of the city with a superb beachfront location offering soft white sands, warm water, and a peaceful setting. Pattaya Beach, the most popular in the area, is close by and offers a wide variety of water sports. The bustle of Central Pattaya with its electrified nightlife is only a short taxi ride away. Other famous attractions in the area include: the beautiful island of Koh Larn, Pattaya floating market, and the unique ornate Sanctuary of Truth.

For more information and to register for the conference, visit our conference website at *https://texasimconference.tamu.edu/*. If you have any other questions, please feel free to contact our office manager, Lori Kessler [*LKessler@cvm.tamu.edu*, (979) 458-0732].

You will need to reserve your room with the Centara Grand Mirage Beach Resort, Pattaya, directly by emailing Ms. Issarapornte (issarapornte@chr.co.tr). When you do this, please make sure you tell them you are with the "Internal Medicine Conference" group in order to secure the discounted rate and inclusive extras.

This event is made possible by the generous support from our sponsors Nutramax Laboratories Veterinary Sciences, Idexx Laboratories, Royal Canin, and Hills Pet Nutrition.

We really hope that you can join us for what promises to be an unforgettable experience! (Jonathan Lidbury)

# VET KU - TEXAS A&M

## *Internal Medicine Conference*

## FOCUS: GASTROENTEROLOGY

## MONDAY, OCTOBER 29TH, 2018 - FRIDAY, NOVEMBER 2ND, 2018

### CENTARA GRAND MIRAGE BEACH RESORT | PATTAYA, CHON BURI THAILAND

| | BEFORE MAY 15, 2018 | MAY 16 - AUGUST 1, 2018 | FROM AUGUST 2, 2018 |
|---|---|---|---|
| TAMU FACULTY AND ALUMNI | $600 | $720 | $840 |
| GENERAL PARTICIPANTS | $750 | $900 | $1,050 |

DR. DAVID C. TWEDT
COLORADO STATE UNIVERSITY

DR. STANLEY L. MARKS
UNIVERSITY OF CALIFORNIA, DAVIS

DR. KATHERINE TOLBERT
UNIVERSITY OF TENNESSEE

DR. JONATHAN A. LIDBURY
TEXAS A&M UNIVERSITY

DR. JAN S. SUCHODOLSKI
TEXAS A&M UNIVERSITY

DR. JÖRG M. STEINER
TEXAS A&M UNIVERSITY

- FACULTY OF VETERINARY MEDICINE, KASETSART UNIVERSITY
- TEXAS A&M UNIVERSITY

KU Kasetsart University Faculty of Veterinary Medicine

TEXAS A&M UNIVERSITY
Veterinary Medicine & Biomedical Sciences

# VET KU - TEXAS A&M *Internal Medicine Conference*

## MONDAY, OCTOBER 29TH, 2018

| | | |
|---|---|---|
| 8:00 AM - 8:50 AM | RATIONAL APPROACH TO THE DYSPHAGIC DOG: A CASE-BASED APPROACH | STANLEY L. MARKS |
| 9:00 AM - 9:50 AM | PREVENTION AND MANAGEMENT OF ESOPHAGITIS AND ESOPHAGEAL STRICTURES | STANLEY L. MARKS |
| 10:20 AM - 11:10 AM | APPROACH TO THE PATIENT WITH GI BLEEDING | KATHERINE TOLBERT |
| 11:20 AM - 12:10 PM | RATIONAL USE OF GASTRIC ACID SUPPRESSANTS | KATHERINE TOLBERT |
| 12:20 PM - 1:10 PM | PANEL DISCUSSION: THE USE OF GASTRIC ACID SUPPRESSANTS | TOLBERT, MARKS, TWEDT, LIDBURY, STEINER |

## TUESDAY, OCTOBER 30TH, 2018

| | | |
|---|---|---|
| 8:00 AM - 8:50 AM | SMALL INTESTINAL DYSBIOSIS: FROM BENCHTOP TO CAGESIDE | JAN S. SUCHODOLSKI |
| 9:00 AM - 9:50 AM | PROBIOTICS: PANACEA OR PLACEBO EFFECT | KATHERINE TOLBERT |
| 10:20 AM - 11:10 AM | FECAL MICROBIOTA TRANSPLANT: A GUIDE FOR CLINICIANS | JAN S. SUCHODOLSKI |
| 11:20 AM - 12:10 PM | FOOD RESPONSIVE ENTEROPATHY | STANLEY L. MARKS |
| 12:20 PM - 1:10 PM | PANEL DISCUSSION: MODULATION OF THE INTESTINAL MICROBIOTA | SUCHODOLSKI, MARKS, TOLBERT, TWEDT, STEINER |

## WEDNESDAY, OCTOBER 31ST, 2018

| | | |
|---|---|---|
| 8:00 AM - 8:50 AM | PROTEIN LOSING ENTEROPATHY: IMPROVING PATIENT OUTCOME | KATHERINE TOLBERT |
| 9:00 AM - 9:50 AM | DO I REALLY NEED TO WORRY ABOUT EPI IN CATS? | JÖRG M. STEINER |
| 10:20 AM - 11:10 AM | DIAGNOSIS OF CANINE PANCREATITIS: WHICH TESTS CAN I TRUST? | JÖRG M. STEINER |
| 11:20 AM - 12:10 PM | OPTIMIZING MANAGEMENT OF CANINE ACUTE AND CHRONIC PANCREATITIS | JÖRG M. STEINER |
| 12:20 PM - 1:10 PM | CONTROVERSIES IN PANCREATITIS: LAB TESTING, LOW-FAT, CORTICOSTEROIDS, AND OTHERS | MARKS, STEINER, LIDBURY, TOLBERT, TWEDT |

## THURSDAY, NOVEMBER 1ST, 2018

| | | |
|---|---|---|
| 8:00 AM - 8:50 AM | APPROACH TO A DOG WITH INCREASED LIVER ENZYMES | JONATHAN A. LIDBURY |
| 9:00 AM - 9:50 AM | GETTING THE MOST OUT OF A LIVER BIOPSY | JONATHAN A. LIDBURY |
| 10:20 AM - 11:10 AM | HEPATIC COPPER ACCUMULATION: WHEN AND HOW TO CHELATE? | DAVID C. TWEDT |
| 11:20 AM - 12:10 PM | CANINE IDIOPATHIC CHRONIC HEPATITIS: THERAPEUTIC CHOICES | JONATHAN A. LIDBURY |
| 12:20 PM - 1:10 PM | ASK THE EXPERT: BRING YOUR CHALLENGING LIVER CASES | TWEDT, LIDBURY, MARKS, TOLBERT, STEINER |

## FRIDAY, NOVEMBER 2ND, 2018

| | | |
|---|---|---|
| 8:00 AM - 8:50 AM | FELINE TRIADITIS: WHAT DO WE KNOW | DAVID C. TWEDT |
| 9:00 AM - 9:50 AM | GI MANIFESTATIONS OF ENDOCRINE DISEASE | JÖRG M. STEINER |
| 10:20 AM - 11:10 AM | INFECTIOUS DISEASE OF THE GI TRACT: WHICH TESTS DO I ORDER? | JAN S. SUCHODOLSKI |
| 11:20 AM - 12:10 PM | HOW TO GET THE MOST FROM GI ENDOSCOPY | DAVID C. TWEDT |
| 12:20 PM - 1:10 PM | SHOW AND TELL: UNUSUAL ENDOSCOPY IMAGES | TOLBERT, MARKS, TWEDT, LIDBURY, STEINER |

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**FOR MORE INFORMATION PLEASE CONTACT:**
**LORI KESSLER**
**TEL. 979.458.0732**
**LKESSLER@CVM.TAMU.EDU**

# An Update on Acute Hemorrhagic Diarrhea Syndrome in Dogs

Acute hemorrhagic diarrhea is a common reason for dogs to be presented to a primary care veterinarian, and the first goal when presented with such a patient is to differentiate gastrointestinal bleeding (e.g., due to coagulopathy or GI ulceration) from hemorrhagic enteritis. This can usually be achieved by determination of the packed cell volume (PCV), since dogs with acute hemorrhagic enteritis typically have severe fluid loss into the intestinal tract and often have significantly increased PCV upon presentation. There are numerous potential causes for hemorrhagic enteritis. However, in most cases the underlying cause cannot be identified using routine diagnostic tests. For these cases of sudden onset of severe hemorrhagic diarrhea of unknown cause, the term "hemorrhagic gastroenteritis" (HGE) was established in the 1970s and was defined as a specific syndrome. In a more recent prospective study, endoscopic and histologic mucosal changes as well as the presence of bacterial species in the intestines of 10 dogs with AHD were evaluated. In these dogs, dense layers of large rod-shaped bacteria identified as *C. perfringens* type A strains were intimately associated with epithelial necrosis in both the small and large intestines (Figure 1). However, no lesions were identified in the stomach. The syndrome was renamed "acute hemorrhagic diarrhea syndrome" (AHDS), and a search for clostridial toxins capable of damaging the mucosa in these dogs was initiated. In 2015, a novel toxin, designated as NetF, was detected in a *C. perfringens* type A strain isolated from a dog with fatal hemorrhagic enteritis. By performing *in vitro* studies, it was confirmed that NetF is highly cytotoxic for an equine ovarian cell line. In addition, several studies showed that the prevalence of *C. perfringens* encoding the *netF* gene was significantly higher in dogs with AHDS compared to healthy control dogs. Thus, currently it is believed that an overgrowth of *C. perfringens* type A strains associated with an increased production of NetF toxin is a contributing cause for AHDS in dogs. However, this hypothesis needs further confirmation.

AHDS is a very dynamic disease. The abundance of enterotoxin and *C. perfringens* strains that encode the *netF* gene decrease significantly over the first few days, and after day seven nearly every dog is below the detection limit of the quantitative PCR assay. Because of this rapid decline of toxigenic *C. perfringens* strains, many dogs with AHDS are already negative for PCR testing at presentation - especially if dogs are not tested during the acute phase of the disease. Therefore, the diagnosis of AHDS is still based on a typical clinical course of the disease and by excluding other known causes of AHD. A serum biochemistry profile, including a SNAP cPL® or Spec cPL, should be performed to rule out renal and liver disease as well as acute pancreatitis. Furthermore, to rule out hypoadrenocorticism, a serum baseline cortisol concentration should also be measured, followed by an ACTH stimulation test if the test result is < 2 µg/dL. A fecal examination (e.g., flotation, intestinal parasite antigen testing, PCR for canine parvovirus) should be performed to rule out nematodes, protozoan parasites, and parvovirosis in suspicious cases. An abdominal ultrasound and/or radiographic examination is indicated to rule out a foreign body, focal intestinal disease, or pancreatitis and should be performed in older dogs and dogs not adequately responding to symptomatic therapy. Diagnosing a bacterial infection causing hemorrhagic enteritis is challenging, since potentially enteropathogenic bacteria can also be found in healthy dogs. Positive test results on diarrhea panels (e.g., fecal culture for enteropathogens, PCR testing for bacterial genes

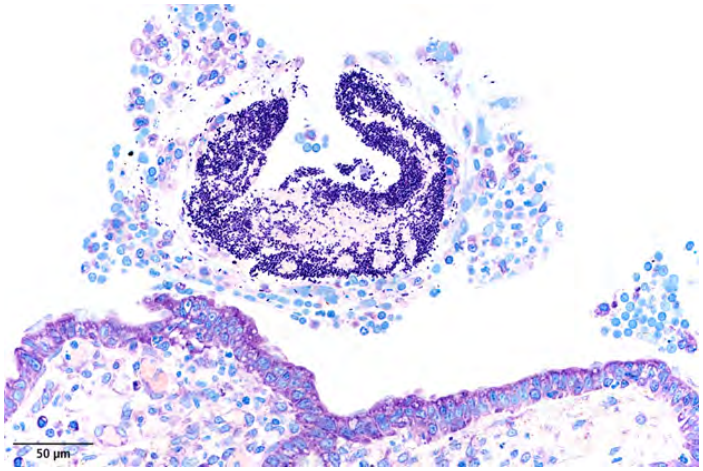


Figure 1: A Giemsa-stained section of small intestine from a dog with AHDS. A dense layer of large rod-shaped bacteria adherent to a necrotic villous can be seen. (Courtesy Dr. Walter Hermanns, Institute of Veterinary Pathology, LMU Munich)

encoding for toxins) are not an indication for antibiotic treatment *per se*.

AHDS is characterized by its rapid self-limiting course with symptomatic treatment. Thus, antimicrobials should only be administered in patients that manifest systemic signs of illness after rehydration and pain management. With adequate fluid therapy (i.e., administration of crystalloids; volumes are depending on the level of dehydration, maintenance requirements, and ongoing losses) a rapid improvement of clinical signs can typically be observed during the first 48 hours without antibiotic therapy. Dogs that do not adequately respond to fluid therapy after 4 hours (i.e., alert mental status, heart and respiratory rate dropping into the normal range, adequate production of urine) should be

*(continued on next page)*

| | |
|---|---|
| **Physical examination finding at presentation** | |
| Hyperthermia (°F) | > 103.1 |
| **Physical examination findings after rehydration and pain management** | |
| Tachycardia (beats/min) | > 140 (small breed dogs)<br>> 120 (large breed dogs) |
| Tachypnea (breaths/min) | > 40 |
| **Hematologic and serum biochemical changes** | |
| Neutrophilia (cells/µL) | > 20,000 |
| Neutropenia (cells/µL) | < 3,000 |
| Band neutrophils (cells/µL) | > 1,500 |
| Hypoglycemia (mg/dL) | < 63 |

Table 1: Criteria for antibiotic use in dogs with AHDS

categorized as "complicated AHDS" patients. Complicated AHDS patients should be evaluated for other underlying causes (e.g., acute pancreatitis, viral enteritis) and a systemic infection with obligate pathogenic bacteria should be considered. Antibiotic therapy is also indicated in patients that are immunocompromised (e.g., patients treated with immunosuppressive dosages of corticosteroids or another immunosuppressant, patients with parvovirosis), show evidence of hepatic dysfunction, have a portosystemic shunt or a patient that fulfills the criteria listed in Table 1. Additional symptomatic treatment includes antiemetic therapy in every patient that appears nauseated or is actively vomiting (e.g., maropitant 1 mg/kg q24h SQ/IV) and analgesics in every dog with suspected abdominal pain (e.g., buprenorphine 0.01 mg/kg q6-8h IV). Trickle feeding with an oral glutamine solution or low-fat (liquid) diet is important for local nutrition of enterocytes and can improve regeneration of the intestinal mucosa. High-dose probiotic therapy potentially helps to displace *C. perfringens* strains from the gastrointestinal tract in dogs with AHDS.

In summary, there is strong evidence that the clostridial NetF toxin is associated with intestinal epithelial necrosis in dogs with AHDS. Most dogs with acute hemorrhagic diarrhea present with severe dehydration and show rapid clinical improvement with aggressive fluid therapy. Septic complications are uncommon, and prognosis is good, even without antibiotic therapy. However, close

# New Fee Schedule Effective May 1, 2018

| Assay | Previous fee | New fee |
|---|---|---|
| TLI, PLI, Cobalamin, Folate | $ 72.00 | $ 76.00 |
| TLI, Cobalamin, Folate | $ 52.00 | $ 55.00 |
| PLI, Cobalamin, Folate | $ 52.00 | $ 55.00 |
| TLI, PLI | $ 52.00 | $ 55.00 |
| Cobalamin, Folate | $ 36.00 | $ 38.00 |
| Bile Acids (pre or post) | $ 15.00 | $ 18.00 |
| MMA | $ 52.00 | $ 56.00 |
| Triglycerides | $ 15.00 | $ 16.00 |
| Canine Fecal α1PI | $ 44.00 | $ 54.00 |
| Dysbiosis Index | $ 44.00 | $ 48.00 |
| Real-time PCR assay | $ 35.00 | $ 36.00 |
| Giardia/Crytosporidium IFA | $ 35.00 | $ 38.00 |
| *C. difficile* ELISA | $ 29.00 | $ 34.00 |
| *C. perfringens* enterotoxin ELISA | $ 29.00 | $ 34.00 |

New submission forms customized with your clinic's information will be available on our website at ***http://vetmed.tamu.edu/gilab*** after logging in using the maroon "Clinic Login" button.

The information to log in is located in the header of all lab reports. It is your Website User ID and password (Clinic ID). Please see the example below.

If you need further assistance, please email the GI Lab at ***gilab@cvm.tamu.edu***. We will be happy to assist you.


Gastrointestinal Laboratory
Dr. J.M. Steiner
Department of Small Animal Clinical Sciences
Texas A&M University
4474 TAMU
College Station, TX 77843-4474


Website User ID: XXXX@ XXX.XXX OR YYYY@YYY.YYY

GI Lab Assigned Clinic ID: ****

VETERINARY MEDICINE & BIOMEDICAL SCIENCES
TEXAS A&M UNIVERSITY

**Gastrointestinal Laboratory**
Department of Small Animal Clinical Sciences
College of Veterinary Medicine and Biomedical Sciences
Texas A&M University
4474 TAMU
College Station, TX 77843-4474



| Current projects / Contact information | Brief project description |
|---|---|
| **Comparison of parenteral and oral cobalamin supplementation**<br>Dr. Chee-Hoon Chang<br>chchang@cvm.tamu.edu | This project aims to compare the efficacy of parenterally and orally administered cobalamin supplementation in both dogs and cats. Dogs and cats with cobalamin deficiency for any reason can be enrolled. However, patients cannot have any significant co-morbidities, such as chronic kidney disease. This study is fully funded. No cost to owner for participation. |
| **Canine chronic enteropathy study**<br>Dr. Agostino Buono<br>tamu.gilab@gmail.com | The purpose of this study is the discovery of non-invasive biomarkers for dogs with chronic enteropathy. Dogs with chronic signs of gastrointestinal disease in which intestinal biopsies are collected or planned for diagnostic purposes are eligible for enrollment. Unfortunately, dogs that already receive immunosuppressive drugs are excluded from the study. The study provides complete bloodwork, including GI panel, fecal testing, and histopathology interpretation at no cost. Samples can be submitted up to three times (initial presentation and two rechecks). |
| **Evaluation of cyclosporine as a treatment for dogs with chronic pancreatitis and diabetes mellitus**<br>Dr. Sina Marsilio smarsilio@cvm.tamu.edu<br>Dr. Sue Yee Lim slim@cvm.tamu.edu | The aim of this study is to evaluate cyclosporine as a novel therapy for dogs with insulin-resistant diabetes mellitus and chronic pancreatitis. The human literature suggests that chronic pancreatitis may have an underlying immune-mediated etiology and cyclosporine has resulted in improved diabetic control in one dog with chronic pancreatitis as a cause of insulin resistance. Qualifying cases will receive Atopica free of charge for the trial period of six weeks. |
| **The canine liver study**<br>Dr. Yuri Lawrence<br>ylawrence@cvm.tamu.edu | This study is aimed to collect serum samples from dogs with hepatobiliary disease to discover novel biomarkers. |
| **Dietary management for chronic pancreatitis**<br>Dr. Yuri Lawrence<br>ylawrence@cvm.tamu.edu | The aim of this study is to evaluate the efficacy of an ultra-low fat diet for dogs with chronic pancreatitis. The study will provide the diet free of charge for the duration of the study. |
| **Dietary management of primary hyperlipidemia**<br>Dr. Yuri Lawrence<br>ylawrence@cvm.tamu.edu | The aim of this study is to evaluate the efficacy of an ultra-low fat diet for dogs with primary hyperlipidemia. The study will provide the diet free of charge for the duration of the study. |